The Role of Gender in Supporting Active and Healthy Ageing by ICT Solutions: Learning from Latvian, Polish and Swedish Older Adults

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Abstract. Facing the challenges related to ageing population with the help of ICT solutions may depend on various socioeconomic factors and differences in attitudes between women and men. This quantitative study investigates the role of gender in the possibility of using ICT for an active and healthy ageing in Latvia, Poland, and Sweden focusing on (1) needs which are considered important for independent and satisfying ageing and (2) technological solutions that should be developed to support independent and healthy ageing. In our approach to statistical data analysis we adopted the ordered logistic model. The findings implicate that gender differences in adoption of ICT for active and healthy ageing may vary between countries. In particular, with respect to the needs, the gender differences appear the greatest in Sweden, while as regards technological solutions, the gender gap is visible only in Poland. The results also show a need to develop some technologies regardless of socioeconomic considerations, such as technologies supporting independent living of elderly women and communication technologies allowing older women to participate in cultural activities.

Keywords: Gender · ICT · Active and healthy ageing · Older adults · Latvia · Poland · Sweden

1 Introduction

Nowadays, population ageing is a typical phenomenon in developed countries, which will deepen in time [9]. To counteract the negative effects of an ageing population and use the potential of older people, various strategies are suggested and developed, such

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as the policy of active and healthy ageing [31] or productive ageing [28]. Various forms of activity within these strategies can be seen as essential elements for maintaining health of an ageing society. In particular, social participation such as volunteering or informal care are considered as necessary elements in a new holistic approach to care, which, thanks to the use of ICT, should have integrated care support for citizens' health through linked social and health care [21]. However, the use of the ICT-enabled opportunities is not the same for all countries, societies or individuals. This is due to different levels of countries' digital development or digital inclusion of society [13, 26]. Countries may also differ with respect to the social and healthcare systems, which can be manifested in the level of implementation of the strategies for ageing society (e.g. possibilities to access health services, active and independent living, financial security, social participation, and digital inclusion of the elderly) [15, 33].

Previous research suggests that the use of ICT in transition economies, i.e. countries that are transitioning or recently transitioned from centrally planned economy to a free market system, is characterized by different considerations than those experienced by the most developed countries [22]. The level of digital development of transition economies, together with the degree of implemented active ageing strategies, is lower than that of developed countries [26].

Research into the possibility of using ICT for active and healthy ageing at the individual level usually refers to the explanations of socioeconomic and digital considerations, especially if they relate to comparative analyzes [e.g. 4, 15, 24]. Prior studies, mainly qualitative, also reveal that certain individual characteristics such as beliefs, social networks, health, and IT skills can be factors that differentiate the use of ICT for healthy ageing [20, 32]. However, the role of gender, which seems to be an important issue, is rarely considered in research [20] and, in this regard, the results achieved in the field of ICT adoption and use by older adults are ambiguous [30].

Studying the role of gender in the context of ICT and active ageing is justified for several reasons. First, women live longer than men; therefore more older women than men can be left without a partner [7, 23]. On the one hand, this may result in the need for care from third parties; on the other hand, it may motivate women to seek out-of-home activities, in which ICT solutions can be helpful. Another premise for research into the role of gender is the fact that older women are more often involved in spousal and partner care than men [3, 29] and can expect support from modern ICT solutions. However, the availability of such solutions for women may be more limited than for men because of the high costs and the fact that the gender gap in poverty is higher among older age groups and reflects inequalities rooted in the labor market. Women have fewer chances to achieve an adequate pension due to lower employment rates, more frequent part-time employment than men, and lower wages [5, 18].

The aim of this paper is to investigate the role of gender in the possibility of using ICT for an active and healthy ageing in the context of diverse socioeconomic considerations on the example of three countries: Latvia, Poland and Sweden. These three countries appear diverse with respect to the level of digital development [26]. However, Poland and Latvia appear similar to each other as regards the level of the implementation of strategy for active and healthy ageing [25]. They also reveal the considerations of transition economies [26, 27]. This study seeks to answer the following research questions: *(1) Do women and men in Latvia, Poland and Sweden differ in the perception*

of factors that are important to have an independent and satisfying life as people age? (2) Do women and men in Latvia, Poland and Sweden differ in the perception of technological solutions that should be developed to support independent and healthy ageing?

The remainder of the paper is organized as follows. In the next section, we describe the background for this study. Next, we present our research method followed by the presentation of the results. We then discuss our findings and explain implications for practice. The study ends with concluding remarks.

2 Background

Prior research among older adults in Latvia, Poland and Sweden showed that regarding factors important for satisfying and independent ageing, older adults in Sweden have higher requirements than respondents in Poland and Latvia. Regarding technological solutions that should be developed to support independent and healthy ageing, Polish respondents identified that a broad spectrum of such technologies should be developed; Latvians were more moderate in their opinions, while Swedish respondents emphasized only a few areas where the technological solutions to support independent and healthy ageing should be developed [26].

Investigating the role of gender in the possibility of using ICT for an active and healthy ageing in the context of diverse socioeconomic considerations (Latvia, Poland and Sweden) is interesting for at least three reasons: (1) demographic differences, (2) differences in IT-skills and adoption of ICT solutions, and (3) different level of involvement in spousal and partner care.

Regarding demographic considerations, life expectancy and the level of health measured by the length of healthy years differs in the three studied countries (see Table 1). Comparing Latvia, Poland and Sweden, we notice that the Swedes live the longest, while the Latvians live the shortest. The similar regularity applies to healthy life years. In each of the three countries, women live longer. However, the biggest differences in life expectancy in favor of women are in Latvia and Poland, but gender gap is rather insignificant in the case of healthy life years. This means that, compared to men, older women in Poland and Latvia may need care for a longer period of time than Swedish women.

The ability to use ICT for active ageing will also depend on the ICT skills and experience of older people and, as suggested by extant research, lack of such skills is a strong barrier [24, 32]. In Europe, the digital skills of older people as well as the level of digital development at the macro level are the highest in the Scandinavian countries and in the UK, in contrast to transition economies, and these characteristics are strongly correlated with the implementation of active and healthy ageing policies, measured using Active Ageing Index (AAI) (see Table 1, [26]). However, the broadly understood acceptance of ICT by older people depending on gender is not well researched and the results are ambiguous [20, 30].

Table 1. Country comparison

	Latvia			Sweden			Poland		
Life expectancy – 2016*									
Female	79.6			83.7			81.9		
Male	69.8			80.1			73.9		
Healthy life years (65+) – 2016*									
Female	4.5			16.6			8.9		
Male	4.4			15.1			8.2		
Individuals using the Internet during last 12 months (%) - aged 55–74**									
Year	2016	2017	2018	2016	2017	2018	2016	2017	2018
Female	53.9	56.4	65.2	92.0	91.1	93.0	41.4	45.2	48.8
Male	55.8	58.1	59.1	93.1	91.3	62.2	44.7	47.6	48.6
Total active ageing index domains and gender gap – 2014***									
Employment	32 (+2.4 Male)			43.4 (+7.1 Male)			22.4 (+12.5 Male)		
Social participation	13.8 (+6.3 Female)			22.9 (+0.8 Female)			12.1 (+2.3 Female)		
Independent Living	58.7 (+3.8 Male)			78.6 (+1.9 Male)			64.9 (+3.2 Male)		
Capacity for Active Ageing	48.2 (+1.2 Male)			69.2 (+0.7 Male)			47.9 (+2.0 Female)		

Notes: *based on Eurostat database, **based on OECD.org, ***based on [33], gender gap shown in parentheses

In the review of studies dealing with ICT and the elderly, Wagner [30] indicated only two studies which have examined the impact of gender on attitudes toward computers, but results have been inconclusive, with one study showing that males have more positive attitudes and the other finding no relationship. In the similar vein, Peek et al. [20] in the literature review regarding acceptance of technology for ageing in place indicated that gender was not present in the reviewed qualitative studies, but was researched in one of three reviewed quantitative studies. This study showed that gender negatively influenced the acceptance of a motion monitoring system, but not the acceptance of a vitals signs monitoring system. Unfortunately, the authors did not specify whether the motion monitoring system was more accepted by males or females [17]. Similar inconclusive pattern is found in the most recent studies [1, 14]. In particular, Hunsaker and Hargittai [14] showed that gender differences are not clear regarding older adults' use of Internet. The gender gap appears for the oldest group of older adults but is not visible among the younger groups of older adults. While Abolhassani et al. [1] indicate that gender matters regarding acceptance of health ICTs, their study showed that the acceptance rate decreased across age categories for women and that women were less likely to accept data accessibility to non-physicians. Abolhassani et al.'s study contradicts prior studies on adoption of health related ICT, which demonstrated no effect of gender [12]. In addition, OECD statistics on individuals using the Internet for older people (see Table 1) show some unexpected trends in relation to men, whose growing participation in the use of the Internet is gradually slowing down in recent years, and in the case of Swedes even dropped significantly. For women in Poland and Latvia, there is a growing tendency, and in all three countries in 2018, more older women than men were Internet users.

Another aspect that may be important for the possibility of using ICT for an active and healthy ageing is women's and men's different way of involvement in spousal and partner

care. Prior research shows that both men and women are involved in spousal and partner care, but the level of involvement and the way of caregiving differ [3]. Most caregiving women take care of their spouses and partners on their own while men more often share caregiving with other informal helpers such as family members, friends or neighbors. This fact could be explained by men's higher engagement in the labor market. When it comes to cash for care payments, women are generally more willing to engage in such arrangements than men and low-paid women more often than high-paid women [8]. This fact increases the risk for women poverty in advanced age, but better helps families to integrate family care and paid work. Prior research shows that the gender inequality is highest in countries with a high level of intergenerational care, a low provision of professional care services, and high family obligation norms [3, 8, 11].

3 Method

In our study, we focused on the investigation of the opinions of the older adults concerning the needs related to independent living and the attitudes towards using ICT. Data for Sweden (Örebro County) came from a larger study conducted by the municipality of Örebro, which, among other things, had a goal of assessing the needs related to the ageing of the population. On the basis of a research instrument used by the municipality of Örebro, a survey for Poland (Krakow and its surroundings) and Latvia (Riga and its surroundings) has been constructed. In order to achieve the comparability of country samples, from the Swedish database we randomly drew 10% of respondents taking into account the proportions in the age and gender structure of the analyzed population. Our preliminary survey was directed to older adults aged 50 to 89 years.

The questionnaire included two categories of questions. The first category concerned the needs which the respondents may consider important for an independent and satisfying life as people age. We presented the following 9 factors to the respondents and asked for their evaluation: (1) ability to choose where they will live (e.g. independently at home, at home with family, nursing home, at home with help coming); this factor was named "type of residence", (2) ability to choose what they will eat ("kind of food"), (3) ability to choose when they will eat ("time of meals"), (4) ability to be outside when and as much as they want ("time in outdoors"), (5) ability to participate in cultural activities (e.g. theater, cinema, concerts – "cultural activity"), (6) ability to perform physical activity ("physical activity"), (7) ability to decide what kind of help they will receive (e.g. personal care, cleaning, shopping – "kind of aid"), (8) ability to choose the time of assistance ("time of aid"), and (9) ability to choose the assisting person ("assisting person").

The second category related to the types of ICT solutions that should be developed to support independent and healthy ageing. We presented the following 7 examples of digital solutions for the evaluation by the respondents: (1) robots assisting independent eating (this device was named as "eating"), (2) technologies facilitating communication (e.g. with family, health care, care personnel – "communication"), (3) memory-supporting technology ("memory"), (4) health monitoring technologies (e.g. remote transmission of blood pressure measurement, sugar level – "health monitoring"),

(5) technology that help with personal hygiene ("hygiene"), (6) cleaning robots ("cleaning"), and (7) monitoring and alarming technologies (e.g. fall detection – "alarming"). In each case, a three-point Likert-type scale was employed for factor evaluation: 1 – not important, 2 – important, and 3 – very important. The Swedish sample consisted of 409 people (female/male median age = 67/69), the Polish sample counted 470 people (female/male median age = 67/67), and the Latvian sample consisted of 315 respondents (female/male median age = 69/68).

When examining the role of gender in perceiving the importance of the needs related to active and healthy ageing and attitudes towards the development of technology, a two-stage approach was applied. In the first exploratory step, the simplest method for analyzing categorical (nominal) data was used to assess the attitudes of women and separately the attitudes of men. This approach allowed us to observe the potential impact of varied socioeconomic considerations of the studied countries on women's and men's attitudes.

In the next step, individual countries were analyzed separately for each indicated type of need. It was examined whether women have a lower or higher propensity than men to a higher assessment of the importance of the indicated needs. For this purpose, using the STATISTICA package, the ordered logistic model (OLM) belonging to the generalized linear models (GLM) was employed [6, 19]. In OLM models, the dependent variable defines the consecutive levels of importance as regards the given need: not important, important, and very important. The first independent variable is gender with the category "male" as a reference category. The second independent variable is age, defined as a qualitative variable with four categories (50–59, 60–69, 70–79, 80–89). Age is treated as a control variable with "60–69" as a reference category.

4 Results

Results achieved in the first step, calculated separately for women and men, revealed that women in Sweden have higher requirements regarding needs important for satisfying and independent ageing than women in Poland and Latvia. However, women in Poland are most interested in the development of technology supporting independent ageing, while women in Sweden point more selectively to only certain technological solutions (alarming, communication and memory). Similar results were observed in the subpopulation of men, however, in the case of technology supporting independent ageing, Swedish male respondents were mostly interested in the development of alarming solutions and those facilitating communication.

In Tables 2 and 3 we present the results of ordered logit models for factors for independent life as people age and for supported technologies. In the case of the variable "gender", positive values denote that women reveal a greater propensity than men to evaluate more highly the needs associated with independent and healthy ageing, or to assess more favorably the need for development of given technological solutions. In the case of negative values, the interpretation is the opposite – women reveal a smaller propensity than men to evaluate more highly relevant needs. Similarly, we

interpret the control variable age, referring to the reference group 60–69 years. For all statistically significant variables, the results are interpreted based on a *ceteris paribus* assumption.

Table 2. Results of ordered logit models for factors for independent life as people age

Variable	Type of residence	Kind of food	Time of meals	Time in outdoors	Cultural activity	Physical activity	Kind of aid	Time of aid	Assisting person
Latvia									
Cons1	−2.51**	−1.88**	−1.38**	−1.28**	−0.21**	−1.02*	−1.40**	−1.09**	−0.84**
Cons2	−1.08**	0.11	0.53**	0.22	1.25*	0.53*	0.37	0.51*	0.69*
Gender	−0.03	0.09	0.14	0.09	0.22*	−0.21*	0.20*	0.01	0.21*
50–59	0.45*	0.30	0.29†	−0.15	0.02	0.25	0.04	0.14	0.12
70–79	0.06	−0.04	0.10	−0.28*	−0.00	0.06	0.17	0.12	−0.02
80–89	0.10	−0.29†	−0.13	−0.40*	−0.29†	−0.18	0.19	0.18	−0.11
Dev#	0.86	0.98	1.06	0.95	1.08	1.09	1.07	1.10	1.09
Poland									
Cons1	−3.71**	−3.04**	−1.69**	−3.61**	−2.17**	−2.89**	−2.08**	−2.13**	−2.67**
Cons2	−1.06*	0.18	0.73**	−0.64*	0.58**	−0.08	0.25	0.50*	−0.37
Gender	0.15	0.24*	0.09	0.36**	0.42**	0.21*	0.34**	0.14	0.21*
50–59	0.07	−0.07	−0.10	−0.16	−0.47**	−0.28*	−0.02	−0.09	0.25
70–79	−0.12	−0.13	−0.21*	0.03	−0.03	−0.14	−0.05	−0.24*	−0.00
80–89	−0.06	0.03	0.18	−0.10	0.06	−0.03	0.14	0.24	0.20
Dev#	0.85	1.11	0.99	0.92	0.87	0.91	0.95	0.94	0.91
Sweden									
Cons1	−5.16**	−3.85**	−2.93**	−3.83**	−1.82**	−2.59**	−4.19**	−4.11**	2.34**
Cons2	−1.29**	−0.97**	−0.40	−1.06**	0.39	0.03	−1.28**	−1.21**	−0.41
Gender	0.76**	0.39**	0.39**	0.38**	0.24*	0.28**	0.35**	0.43**	0.48**
50–59	−0.19	−0.10	−0.17	−0.21	0.08	0.15	0.06	0.09	−0.07
70–79	−0.17	−0.21	−0.09	−0.42*	−0.13	−0.09	−0.01	−0.00	−0.16
80–89	−0.20	−0.32	−0.01	−0.46*	−0.44*	−0.51**	−0.30	−0.20	−0.19
Dev#	1.18	1.07	0.83	0.62	0.93	0.86	1.29	1.48	0.78

Notes: ref. category: gender – male; age categories: (50–59, 70–79, 80–89) – 60–69;
significance †$p < 0.1$; *$p < 0.05$; **$p < 0.01$; #Goodness of fit: Criterion deviance (Stat/df)

Our results indicate that gender affects the perception of factors that are important for active and healthy ageing. However, the differences vary in the studied countries.

Gender gap is particularly visible for Sweden and Poland. Women in these countries more often have higher requirements than men (they assess the importance of individual needs higher), while in Latvia gender differences are less clear-cut. Namely, the needs for cultural activity, the kind of aid received and the ability to decide on the choice of a helper were more important for women, while the need for physical activity turned out to be more important for men (the only case where men were more demanding).

Age-related differences are selective and different in all countries. Only in the case of the need to be outdoors in Sweden and Latvia older generations proved to be less demanding than younger ones, it also seems that the oldest generations pay less attention to the importance of the need of cultural activity.

Table 3. Results of ordered logit models for technologies for independent life as people age

Variable	Eating	Communication	Memory	Health monitoring	Hygiene	Cleaning	Alarming
Latvia							
Cons1	0.23	−1.89**	−1.35**	−1.91**	−0.49*	−0.79**	−1.86**
Cons2	1.71**	−0.23	0.33	−0.15	1.08**	0.72**	−0.03
Gender	−0.01*	0.13	0.28**	0.08	0.25*	0.05	0.17
50–59	0.27	0.26	0.11	−0.06	0.01	0.10	0.31†
70–79	−0.02	0.17	−0.02	−0.00	−0.01	0.25*	0.22†
80–89	0.34*	0.08	0.28†	0.17	0.04	0.17	0.26
Dev#	0.89	1.02	1.07	0.98	1.08	1.09	1.05
Poland							
Cons1	−0.27	−3.91**	−2.43**	−3.06**	−2.11**	−1.69**	−2.84**
Cons2	1.62**	−1.23**	−0.12	−0.45	0.13	0.72*	−0.59*
Gender	0.36**	0.23*	0.40**	0.21*	0.37**	0.34**	0.39**
50–59	−0.13	0.23	−0.00	0.10	−0.05	−0.20	0.03
70–79	−0.06	0.07	0.15	0.14	−0.04	−0.13	−0.00
80–89	−0.42*	0.01	−0.18	−0.09	−0.09	0.14	−0.04
Dev#	1.06	0.85	0.84	0.90	0.90	0.97	0.75
Sweden							
Cons1	1.89**	−2.24**	−2.02**	−1.35**	−0.03	0.89**	−3.08**
Cons2	3.68**	−0.32	0.66**	0.95**	2.37**	3.22**	−0.34
Gender	0.11	−0.02	0.25*	−0.04	−0.15	0.07	0.02
50–59	−0.02	0.09	0.29*	0.20	−0.02	0.17	−0.14
70–79	0.04	0.20	0.11	0.13	−0.00	0.03	−0.16
80–89	0.04	−0.08	−0.33†	−0.14	−0.29	−0.44*	−0.18
Dev#	0.48	0.93	0.94	1.03	0.96	0.79	0.76

Notes: ref. category: gender – male; age categories: (50–59, 70–79, 80–89) – 60–69;
significance †$p < 0.1$; *$p < 0.05$; **$p < 0.01$; #Goodness of fit: Criterion deviance (Stat/df)

Regarding the perception of technological solutions that should be developed to support independent and healthy ageing, gender gap has appeared mainly in Poland. Women perceived the importance of developing such technological solutions stronger than men. In Latvia, this pattern occurred only in the case of solutions supporting memory and personal hygiene, while in Sweden only the development of solutions supporting memory turned out to be more important for women. Regarding other solutions, we did not find any significant differences due to gender.

There was also a slight impact of age on the perception of the importance of technology supporting independent and healthy ageing. It appeared mainly in Latvia and Sweden. The oldest generations to a lesser extent pointed to the need to develop technology that facilitates cleaning and supporting memory in Sweden, while in Poland this relationship concerned only the development of devices supporting independent eating. The opposite situation was found in Latvia, where the oldest also expressed a greater need for the development of devices assisting independent eating and memory-supporting technologies. In addition, generations 70–79 more strongly pointed to the need to develop devices that help in cleaning and alarming technologies. Also, in Sweden the youngest generation expressed a stronger need to develop memory-supporting technologies, while in Latvia the youngest mentioned alarming technologies.

Therefore, summing up, if age-related differences were present (i.e. were statistically significant), these indicated that older generations may be less interested in the development of technologies supporting active and healthy ageing in Sweden and Poland, while the development of technologies was more important for older Latvians. However, for the youngest generations, the differences indicated their stronger perception of the importance of technology development.

5 Discussion

The study addresses two research questions, which we discuss in the following subsections individually.

5.1 RQ1: Do Women and Men in Latvia, Poland and Sweden Differ in the Perception of Factors that Are Important to Have an Independent and Satisfying Life as People Age?

Our results show that gender differentiates older adults' perception of factors that are important for an independent and satisfying ageing in all studied countries. The gender gap is the biggest in Sweden, clearly visible in Poland, but less obvious in Latvia, which was a surprising result. We expected the biggest gender gap in Poland and Latvia, since in these two countries women live considerably longer than men. We assumed that because of the considerable differences in life expectancy, more older women in Poland and Latvia need to live without a partner as they age and that fact could influence their need for care from third parties (e.g. kind of aid, time of aid). Living alone could also motivate women to seek out-of-home activities (such as physical or cultural activities). We expected small or none gender gap in Sweden, since in this country life expectancy and number of healthy life years is almost similar for men and woman (see Table 1). While results from Poland confirmed our expectations, results from Sweden and Latvia surprised us. Further research is needed to explain why the gender gap is the biggest in Sweden and Poland and less visible in Latvia.

One could expect that results from Poland and Latvia should be similar because of comparable demographic and socioeconomic considerations but different from Sweden.

However, by considering the complexity of the considerations in more detail (e.g. interrelationships between various factors), one can try to partially explain the results obtained. The AAI indexes indicate that women are more involved in volunteering activities and caring for the older relatives and children (see "Social participation" domain of Active Ageing Index in Table 1). For this reason women may emphasize the importance of the needs related to caregiving (e.g. assisting person or kind of aid) stronger that men. However, at the same time, the Independent Living indexes show a gender gap related to secure living (see Table 1) [33]. In particular, women are more likely to experience financial problems than men, they more often live alone and feel less safe. These aspects may also influence women's higher evaluation of the importance of the needs related to independent living.

It is worth noticing that the models for elderly care, as well as the level of available funds allocated by the state for elderly care, differ in the studied countries [16]. Sweden is one of the countries with the best-developed elderly care organization and the highest financing of care by the government, while Poland belongs to the group of countries with the least-developed care organization and the lowest level of funds allocated for elderly care. The situation in Latvia is slightly better than in Poland. It is possible that high expectations related to the government's support (as in Sweden) related to caregiving may encourage Swedish women to express higher demands for the quality of care (e.g. type of residence, time of aid or time of meals), while less developed organization of care and low availability of funds offered by the government may result in lower expectations (requirements) in this respect.

Previous research shows that poor health can reduce women's and men's time in active leisure. However, disability status in particular has pervasive negative influence on participation and time in discretionary activities like leisure, as well as time in paid work, care work, and volunteering, but research has not yet examined how disability and time use patterns differ between women and men [23]. This could explain the differences in perceptions of the needs for time in outdoors and physical activity in Latvia compared to Poland and Sweden in the context of differences in healthy life expectancy.

As many different factors may be involved, further research is needed to explain why older woman generally have greater requirements than older men regarding factors important for satisfying and independent ageing and why there are clear differences in gender gap between Latvia, Poland and Sweden.

5.2 RQ2: Do Women and Men in Latvia, Poland and Sweden Differ in the Perception of Technological Solutions that Should Be Developed to Support Independent and Healthy Ageing?

Our results show that the difference in the perception of technological solutions that should be developed to support independent and healthy ageing between women and men is clearly visible in Poland, but not so obvious in Sweden and Latvia. In these two countries gender differences appeared only for single types of ICT. As discussed earlier, prior research is not conclusive regarding the role of gender in adoption of ICTs [e.g. 1, 14, 30]. Our results implicate that gender differences in adoption of ICT may vary between different countries.

The interesting question is why the gender gap in the perception of technological solutions that should be developed to support independent and healthy ageing is more visible in Poland than in Latvia and Sweden. Looking at the patterns in using Internet by older adults (see Table 1), Poland does not differ significantly from Sweden and Latvia. In all countries older women use Internet to a similar extent as older men do; only for 2018 the difference between female and male Internet users in Sweden was bigger than in Poland and Latvia.

ICT solutions for independent and healthy ageing may help older adults to be able to cope with everyday life at home but can also support older adults as caregivers for their partners and spouses. Previous research showed that there is a clear gender gap regarding level of involvement in spousal and partner care in European countries and that the gap is higher in countries with a high level of intergenerational care, a low provision of professional care services, and high family obligation norms [3, 8, 11]. Examples of such countries are Poland and Latvia, however, in Poland the obligations and norms regarding care of the older family members are more obvious and higher than in Latvia. Also, as indicated earlier, Poland has a less developed organization of long-time assistance for the elderly, as well as significantly fewer resources are dedicated for elderly care [10, 16]. This could partly explain the differences in the gender gap between Poland and Latvia. However, more research is needed to better understand the reasons behind the differences in the perception of technological solutions that should be developed to support independent and healthy ageing between men and women and to understand the differences in gender gap between Latvia, Poland and Sweden.

5.3 Implications

Three implications seem to emerge from our study on the role of gender in the possibility of using ICT for an active and healthy ageing in the context of diverse socioeconomic considerations on the example of three countries: Latvia, Poland and Sweden. First, women and men in Latvia, Poland and Sweden differ in the perception of factors that are important for an independent and satisfying ageing. Women have generally higher requirements regarding factors important for independent and satisfying ageing than man. This indicates that gender is an important factor to consider in developing of the so-called silver economy, which should support the implementation of strategies for ageing society.

Second, the differences in the perception of technological solutions that should be developed to support independent and healthy ageing between women and men are clearly visible in Poland, but not so obvious in Sweden and Latvia. Our results may indicate that in countries with more traditional ways of caring for the elderly the recipients of technology may more often be women. As women in such countries may often have limited financial possibilities, there is a need to develop solutions for "home use" (i.e. lighter, cheaper) and also to develop financial solutions that would make the solution more available for poor users (i.e. leasing). Regardless of institutional solutions, the development of alarming and memory supporting technology is desirable. These solutions can increase the level of safe habitation for women that live alone at a more advanced age.

Third, given the stronger need of women related to cultural activity and their restricted financial and communication capabilities (i.e. women more likely than men limit their driving in situations like bad weather or at night, and their health limitations strongly reduce the desire to drive [2]), it appears worth developing various forms of communication technology such as video transmission and social platforms, allowing for greater participation in broadly understood cultural events.

6 Conclusions

The current study investigated the role of gender gap in the context of ICT and active and healthy ageing. We examined older adults in three countries with different socio-economic considerations, i.e. Latvia, Poland and Sweden. Employing the ordered logistic models we achieved the results that implicate that gender differences in adoption of ICT of active and healthy ageing may vary between countries. In the case of factors that are important for an independent and satisfying ageing, the gender gap was the biggest in Sweden, clearly visible in Poland, but less obvious in Latvia. In turn, differences in the perception of technological solutions that should be developed to support independent and healthy ageing between women and men were clearly visible in Poland, but not so manifested in Sweden and Latvia.

Important implications suggested by our research include: (1) The need to take into consideration gender issues in the development of the so-called silver economy and to incorporate different gender-related needs to support the implementation of strategies for ageing society; (2) Development of technological solutions supporting elderly care that are more affordable and better aligned for home, whose users are first and foremost women from countries with a low provision of professional care services, and high family obligation norms regarding care of the older family members; (3) The need to develop some technologies regardless of socioeconomic considerations, such as technologies supporting independent living of the elderly women (e.g. alarming, technology supporting memory) and communication technologies allowing older women to participate in cultural activities, due to greater mobility barriers experienced by older women.

Our study had an exploratory nature and the problems related to the explanation of the results indicate both some limitations and the possibilities for future research. The reasons of problems might be associated with the focus on the elderly living in large cities and the fact that some characteristics of individuals were not considered in the study. In future research it is worth considering such characteristics as health status, providing or receiving help, or type of residence (including countryside, not just cities). Inclusion of these factors might diversify the examined population to a greater extent. This is an interesting issue to be considered in further research.

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